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PATENT COOPERATION TREATY

PCT

NOTIFICATION OF ELECTION

(PCT Rule 61.2)

From the INTERNATIONAL BUREAU

To:

Assistant Commissioner for Patents
United States Patent and Trademark
Office
Box PCT
Washington, D.C.20231
ÉTATS-UNIS D'AMÉRIQUE

in its capacity as elected Office

Date of mailing (day/month/year) 28 February 2000 (28.02.00)	
International application No. PCT/EP99/04560	Applicant's or agent's file reference PCT-1044-009/co
International filing date (day/month/year) 01 July 1999 (01.07.99)	Priority date (day/month/year) 02 July 1998 (02.07.98)
Applicant JACOBSEN, Claus, J., H. et al	

1. The designated Office is hereby notified of its election made:



in the demand filed with the International Preliminary Examining Authority on:

19 January 2000 (19.01.00)



in a notice effecting later election filed with the International Bureau on:

2. The election ☒ was

was not

made before the expiration of 19 months from the priority date or, where Rule 32 applies, within the time limit under Rule 32.2(b).

<p>The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland</p> <p>Facsimile No.: (41-22) 740.14.35</p>	<p>Authorized officer C. Villet</p> <p>Telephone No.: (41-22) 338.83.38</p>
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REC'D 30 OCT 2000

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INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference PCT-1044-009/co	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/EP99/04560	International filing date (day/month/year) 01/07/1999	Priority date (day/month/year) 02/07/1998
International Patent Classification (IPC) or national classification and IPC C01C1/04		
Applicant HALDOR TOPS E A/S et al.		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.



2. This REPORT consists of a total of 5 sheets, including this cover sheet.

☒ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of 1 sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☒ Certain defects in the international application
- VIII ☒ Certain observations on the international application

Date of submission of the demand 19/01/2000	Date of completion of this report 25.10.2000
Name and mailing address of the international preliminary examining authority:  European Patent Office - P.B. 5818 Patentlaan 2 NL-2280 HV Rijswijk - Pays Bas Tel. +31 70 340 - 2040 Tx: 31 651 epo nl Fax: +31 70 340 - 3016	Authorized officer Zalm, W Telephone No. +31 70 340 2804 

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/EP99/04560

I. Basis of the report

1. This report has been drawn on the basis of (*substitute sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to the report since they do not contain amendments.*):

Description, pages:

1-3 as originally filed

Claims, No.:

1-3 as received on 27/07/2000 with letter of 26/07/2000

2. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
☐ the claims, Nos.:
☐ the drawings, sheets:

3. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):

4. Additional observations, if necessary:

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes:	Claims	1-3
	No:	Claims	
Inventive step (IS)	Yes:	Claims	
	No:	Claims	1-3
Industrial applicability (IA)	Yes:	Claims	1-3
	No:	Claims	

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT**

International application No. PCT/EP99/04560

2. Citations and explanations

see separate sheet

VII. Certain defects in the international application

The following defects in the form or contents of the international application have been noted:

see separate sheet

VIII. Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

see separate sheet

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT - SEPARATE SHEET**

International application No. PCT/EP99/04560

Re Item V

Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement:

(a) Reference is made to the following documents:

D1: DE-A-2019706

D2: GB-A-2077613

D3: XP002119097 (&SU-A-321045)

(b) The present application does not satisfy the criterion set forth in Article 33(3) PCT because the subject-matter of **claims 1-3** does not include an inventive step as defined in the regulations (Rule 65 PCT).

Document D1 describes the preparation of ammonia from hydrogen and nitrogen in presence of a catalyst arranged in a fixed bed and at high pressures (see claim 1). The gas stream flows in a radial mode through the bed. At page 9, last paragraph it is noticed that the particles can have a relative (-for such radial beds-) small diameter: 1 to 3 mm. The process of (amended) claim 1 of the application under consideration differs from this teaching in that (in addition, see item VIII below) particles in the range 0.2-1.5 mm are present in the catalyst bed in about equal amounts in the adjacent size-ranges 0.3-0.8 mm and 0.8-1.5 mm. This feature is considered to result in a higher ammonia product yield (because of an improved flow distribution of the gas through the bed; see page 1, last paragraph of the description).

Document D3 teaches that in a fixed ammonia synthesis bed the yield can be increased by making use of a catalyst consisting of coarse and small sized (0.5-1.0 mm) particles. The small sized fraction of the catalyst bed of D3 falls within the two ranges as specified in claim 1 of the application under consideration.

With regard to the argument that the catalyst would be present in the reactor in a fluidized state the following is noticed. Although in the title of the abstract the expression 'fluidized bed catalyst' is indeed used it is mentioned in the abstract that the coarse particles are in a stationary condition whereas the small-sized particles move into the spaces between these coarse particles (see title). The expression 'fluidized bed' should thus be understood as referring to part of the catalyst particles of a bed which as such is static (fixed). A better

expression thus would be 'pseudo-fluidized bed' (this wording is used in the original document). The objectives of the two-size beds disclosed by D3 are similar to those of the process of the present application (increased conversion and less energy consumption). The addition of particles of these sizes (0.5-1.0 mm) to the catalyst known from D1 (1-3 mm) thus appears an obvious measure in order to solve the problem of product yield. The subject-matter of claim 1 is therefore regarded to lack an inventive step.

It is not apparent which part of the application could serve as a basis for a new claim which would satisfy the criteria set forth in Article 33(1) PCT.

Re Item VII

Certain defects in the international application:

The **documents D1, D2 and D3** have not been identified in the description nor has the relevant background art disclosed therein been discussed. The requirements of Rule 5.1(a)(ii) PCT are, thus, not fulfilled.

Re Item VIII

Certain observations on the international application:

The application does not meet the requirements of Article 6 PCT because the subject-matter of **claims 1 and 2** is not clear.

Claim 1 defines a catalyst composition by the volume ratio of three size ranges present in the powder mixture. The particles in the two lower ranges should each be present in an amount of at least 10% of the mixture. According to claim 2 however the bed contains at least 10 volume-% of the particles in the two lower ranges taken together (claim 2: 'having a size between 0.2 and 1.5 mm').

In case of the argumentation that in addition to the catalyst particles in the three ranges of claim 1 other material is present (so that the two small sized ranges only sum up to less than 10 volume-% of the total including the other material) it appears that the definition of the bed composition is indefinite and should be objected under Article 6 PCT.

International Patent Application No. PCT/EP99/04560
Applicant: HALDOR TOPSOE A/S
PCT 1044-00993/Ih
Date: July 26, 2000

NEW CLAIMS 1 TO 3

1. Process for the preparation of ammonia by contacting an ammonia synthesis gas with ammonia catalyst particles arranged in a fixed bed comprising catalyst particles with a particle size in the range of ≥ 0.2 mm to < 1.5 mm, wherein the fixed bed contains a mixture of catalyst particles with a size of 1.5 - 3.0 mm, 0.8 - 1.5 mm and 0.3 - 0.8 mm in a volume ratio of (40 - 70):(10 - 40):(10 - 30).
2. The process of claim 1, wherein the fixed bed contains at least 10% by volume of catalyst particles having a particle size in the range of ≥ 0.2 mm to < 1.5 mm.
3. The process of claim 1 or 2, wherein the synthesis gas is passed in radial direction through the fixed bed.